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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/822,829	04/13/2004	Shmuel Levy	P-6389-US	3259

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EXAMINER	
NGUYEN, LEON VIET Q	
ART UNIT	PAPER NUMBER
2611	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/822,829	LEVY, SHMUEL	
	Examiner	Art Unit	
	LEON-VIET Q. NGUYEN	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,6,7,9-11,13,15,19,20,22,24,28-30 and 32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6,7,9-11,13,15,19,20,22,24 and 28-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/15/08 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 1-3, 5-7, 9-11, 13, 15, 19, 20, 22, 24, 28, 29, 30, and 32 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 5-7, 28-30, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greenstein et al (US6131016) in view of Dabak et al

(US20040071118) and further in view of the background of applicant's specification (hereby referred to as the background).

Re claim 1, Greenstein teaches a method comprising:

adaptively and separately coding an orthogonal frequency division multiplexing sub-carrier (col. 3 lines 59-63, col. 4 line 63 – col. 5 line 1, it would be obvious to have a coding mode for the transmitted data) of first and second sub-carriers symbols data streams (col. 2 lines 41-46, an OFDM signal is well known to have multiple sub-carriers. Since there are multiple sub-carriers, it would be obvious to at least have a first and second sub-carrier) according to a received channel state information that relates to the orthogonal frequency division multiplexing sub-carrier (col. 4 lines 58-63).

Greenstein fails to teach where the first and second sub-carriers symbols data streams either in a diversity mode or in a multiplexing mode. However the background teaches where the first and second sub-carriers symbols data streams are either in a diversity mode or in a multiplexing mode (¶0002).

Therefore taking the combined teachings of Greenstein and the as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the multiplexing MIMO system of the background into the method of Greenstein. The motivation to combine the background and Greenstein would be to prevent the entire transmitted symbol from being in error (¶0003 of the background).

Greenstein also fails to teach wherein said coding mode is selectable so that said sub-carrier is able to support the sensitivity required for transmitting in the selected mode. However Dabak teaches wherein a coding mode is selectable so that said sub-carrier is able to support the sensitivity required for transmitting in the selected mode (¶0032. It is well known in the art that OFDM signals are encoded at the transmitter. Furthermore no specific coding mode is claimed, so any coding mode can be interpreted as the coding mode. The signal gain being adjusted to adjust for any frequency sensitivity in a transmit antenna and fitting the data stream to any required spectral restrictions is interpreted as selecting a coding mode to support the required sensitivity).

Therefore taking the combined teachings of Greenstein with Dabak as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of Dabak into the method of Greenstein. The motivation to combine Dabak and Greenstein would be to improve spectral utilization and immunity to interference (¶0029 of Dabak).

Re claim 2, the modified invention of Greenstein fails to teach a method comprising coding the data stream generated by a multiple-in multiple-out receivers-transmitters system in a multiplexing mode. However the background teaches a MIMO system including a multiplexing MIMO system (¶0002 of the background), which operates in a multiplexing mode.

Re claim 3, the modified invention of Greenstein fails to teach a method comprising coding the data stream generated by a multiple-in multiple-out receivers-transmitters system in a diversity mode. However the background teaches a MIMO system including a diversity MIMO system (¶0002 of the background), which operates in a diversity mode.

Re claim 5, the modified invention of Greenstein teaches a method comprising:

transmitting symbols of the first and second sub-carriers symbols data streams coded in the multiplexing mode (¶0002 of the background) by a first transmitter (transmission circuit 202 in fig. 2A of Greenstein, col. 3 lines 5-6 and lines 59-62 of Greenstein); and

transmitting symbols of the first and second sub-carriers coded in the diversity mode (¶0002 of the background) by a second transmitter (transmission circuit 203 in fig. 2A of Greenstein, col. 3 lines 6-7 and lines 59-62 of Greenstein).

One of ordinary skill in the art would have found it obvious to use both the multiplexing and diversity system in a MIMO system.

Re claim 6, Greenstein teaches a method comprising:

coding symbols of a first subset of sub-carriers of an orthogonal frequency division multiplexing channel (col. 3 lines 5-6 and 59-62 of Greenstein. The OFDM signal transmitted with the first pilot tone is interpreted to be in a first mode.); and

coding symbols of a second subset of sub-carriers of an orthogonal frequency division multiplexing channel (col. 3 lines 6-7 and 59-62 of Greenstein. The OFDM signal transmitted with the first pilot tone is interpreted to be in a second mode).

Greenstein fails to teach where the first subset of sub-carriers is coded in a diversity mode and the second set of sub-carriers is coded in a multiplexing mode. However the background teaches coding the first and second subset of sub-carriers in a diversity and multiplexing mode (¶0002 of the background, It would be obvious to utilize both modes in the coding process).

Therefore taking the combined teachings of Greenstein and the background as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the multiplexing MIMO system of the background into the method of Greenstein. The motivation to combine the background and Greenstein would be to prevent the entire transmitted symbol from being in error (¶0003 of the background).

Greenstein also fails to teach wherein said coding mode is selectable so that said sub-carrier is able to support the sensitivity required for transmitting in the selected mode. However Dabak teaches wherein a coding mode is selectable so that said sub-

carrier is able to support the sensitivity required for transmitting in the selected mode (¶0032. It is well known in the art that OFDM signals are encoded at the transmitter. Furthermore no specific coding mode is claimed, so any coding mode can be interpreted as the coding mode. The signal gain being adjusted to adjust for any frequency sensitivity in a transmit antenna and fitting the data stream to any required spectral restrictions is interpreted as selecting a coding mode to support the required sensitivity).

Therefore taking the combined teachings of Greenstein with Dabak as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of Dabak into the method of Greenstein. The motivation to combine Dabak and Greenstein would be to improve spectral utilization and immunity to interference (¶0029 of Dabak).

Re claim 7, the modified invention of Greenstein teaches a method comprising:

transmitting said first subset of sub-carriers of said orthogonal frequency division multiplexing channel via a first antenna (transmission circuit 202 transmitting via antenna 15 in fig. 2A of Greenstein, col. 3 lines 59-62 of Greenstein); and

transmitting said second subset of sub-carriers of said orthogonal frequency division multiplexing channel via a second antenna (transmission circuit 203 transmitting via antenna 16 in fig. 2A of Greenstein, col. 3 lines 59-62 of Greenstein).

Re claim 28, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 1. It would be obvious and necessary to have a storage medium, having stored instructions thereon, which executes the method as claimed in claim 1.

Re claim 29, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 2.

Re claim 30, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 3.

Re claim 32, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 5.

3. Claims 9, 11, 13, 15, 19, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US20040132496) in view of the background of applicant's specification (hereby referred to as the background).

Re claim 9, Kim teaches an apparatus comprising

first and second mappers (blocks 113 and 114 in fig. 1) to receive first and second encoded data streams (fig. 2, the demuxed output of channel encoder 2110) and to output first and second orthogonal frequency division multiplexing sub-carriers symbols streams (the output of blocks 113 and 114 in fig. 1, ¶0051. An OFDM signal is well known to have multiple sub-carriers. Since there are multiple sub-carriers, it would be obvious to at least have a first and second sub-carrier), respectively;

a coding mode selector (block 111 in fig. 1) to select a coding mode of a symbol of said first and second orthogonal frequency division multiplexing sub-carriers symbols streams (¶0047) according to a received channel state information that related to the orthogonal frequency division multiplexing sub-carrier (¶0058- ¶0059); and

a plurality of receivers (receiver 130 in fig. 1 has multiple antennas. Each antenna is interpreted correspond to a receiver) to be adaptively grouped to a coding mode received with said received channel state information (¶0055, ¶0058. It would be obvious to group the receivers in a single group if there is a single coding mode).

Kim fails to teach wherein the coding mode is selectable from either a diversity mode or a multiplexing mode. However the background teaches coding bits in a diversity MIMO system (¶0002) and suggests also coding at least some of the symbols in a multiplexing mode (¶0003). This is interpreted as being two different coding modes. One of ordinary skill in the art would have found it obvious to be able to select one coding mode.

Therefore taking the combined teachings Kim with the background as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the diversity and multiplexing coding of the background into the apparatus of Kim. The motivation to combine the background and Kim would be to gain sensitivity by exploiting multi path propagation channel property (¶0002 of the background) and to prevent an entire transmitted symbol from being in error (¶0003 of the background).

Re claim 11, the modified invention of Kim teaches an apparatus comprising a multiple-in-multiple-out receivers transmitters system (fig. 1 of Kim).

Re claim 13, the modified invention of Kim teaches an apparatus comprising:

a first transmitter to transmit sub carriers symbols of the first and second orthogonal frequency division multiplexing sub-carriers symbols streams (Ant 1 in fig. 1 of Kim) coded according to the diversity mode (¶0002 of the background); and

a second transmitter to transmit sub carriers symbols of the first and second orthogonal frequency division multiplexing sub-carriers symbols streams (Ant M in fig. 1 of Kim) coded according to the multiplexing mode (¶0003 of the background)

Re claim 15, the modified invention of Kim teaches an apparatus wherein the second transmitter is able to transmit at least some of the first and the second orthogonal frequency division multiplexing sub-carriers symbols streams that are coded according the diversity mode (¶0002 of the background) and at least some other coded symbols of the first and the second orthogonal frequency division multiplexing sub-carriers symbols streams are coded according to multiplexing mode (¶0003 of the background). One of ordinary skill in the art would have found it obvious to use a single transmitter to the coded symbols.

Re claim 19, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 9. Furthermore, dipole antennas are well known in the art.

Re claim 22, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 13.

Re claim 24, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 15.

4. Claims 10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US20040132496) and the background of applicant's specification (hereby referred to as the background) in view of Wu et al (US6985434).

Re claim 10, the modified invention of Kim fails to teach an apparatus further comprising:

a channel state analyzer to select the coding mode based on a quality indicator of the orthogonal frequency division multiplexing sub-carrier of the first and second orthogonal frequency division multiplexing sub-carriers symbols streams.

However Wu teaches a controller which selects either time diversity of spatial multiplexing encoding for two groups of sub-carriers (col. 5 lines 30-38), which is selected to satisfy quality of service (col. 5 lines 39-46).

Therefore taking the modified teachings of Kim and the background with Wu as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the encoding mode selection of Wu into the apparatus of Kim and the background. The motivation to combine Wu, Kim, and the background would be to maximize the throughput gain (col. 5 lines 46-47 of Wu).

Re claim 20, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 10.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEON-VIET Q. NGUYEN whose telephone number is (571)270-1185. The examiner can normally be reached on monday-friday, alternate friday off, 7:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leon-Viet Q Nguyen/
Examiner, Art Unit 2611

/David C. Payne/

Supervisory Patent Examiner, Art Unit 2611